

1FW\$

Appl. No. 10/775,886
Petition to Make Special Under
MPEP § 708.2, VIII

PATENT
Atty. Dkt. No. 81940.0070
Customer No. 26021

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Naoto Matsunami, et al.

Serial No.: 10/775,886

Filed: February 10, 2004

For: STORAGE DEVICE

Art Unit: 2655

Examiner: To Be Assigned

Confirmation No.: 1418

**PETITION TO MAKE SPECIAL UNDER
MPEP § 708.2, VIII**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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March 29, 2005

Date of Deposit

Kimberly Yee

Name

Kimberly Yee 03/29/2005

Signature

Date

Dear Sir:

I. Petition

Applicants hereby petition to make this application, which has not received
any examination by the Examiner, Special.

II. Claims

Check and complete all applicable items (a) through (c).

- (a) x All the claims in this case are directed to a single invention.
- (b) x If the Office determines that all the claims presented are not
obviously directed to a single invention applicant will make an
election without traverse as a prerequisite to the grant of special
status.
- (c) — The applicant submits a preliminary amendment concurrently.

04/04/2005 DEMMANU1 00000024 10775886

01 FC:1464

130.00 DP

III. Search

A. Check all applicable items (d) through (g)

A search has been made by

- (d) ☐ the inventor
- (e) ☐ attorney
- (f) ☒ professional searcher (search report is attached)
- (g) ☐ foreign Patent Office

in the following:

B. Complete all applicable items below

- (h) ☒ field of search: The field of search is described in the attached
Search Report by the professional searcher.

Class: Subclasses:

707	205;
711	112-114, 117-118, 147, 151, and 170;
714	7.

- (i) ☐ publications:
- (j) ☐ foreign patents:
- (k) ☐ search by corresponding foreign Patent Office or at the former
International Patent Institute at The Hague, Netherlands

C. Copy of references

Copies of the references deemed most closely related to the subject matter encompassed by the claims and listed in an Information Disclosure Statement, Form PTO-1449, have been previously submitted.

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Attorney Docket No. 81940.0070
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D. Detailed discussion of the references

There is submitted herewith a detailed discussion of the references which discussion particularly points out how the claimed subject matter is distinguishable over the references.

E. Fee

The fee required by 37 CFR 1.17 (i) (2) is to be paid by

x the attached check for \$ 130.00.

x If there are any additional fees due in connection with the filing of this Petition, please charge the fees to our Deposit Account No. 50-1314. A duplicate copy of this Petition is enclosed.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

Date: March 29, 2005

By: 

Dariush G. Adli
Reg. No. 51,386 .
Attorneys for Applicants

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DETAILED DISCUSSION OF THE REFERENCES AND COMPARISON TO THE PRESENT INVENTION

Embodiments of the Present Invention

The subject matter of the above-identified application relates to a network storage system having multiple type of disks, and the hierarchical storage control thereof. According to one embodiment of present invention, a storage system that is connected to at least one computer is provided. The storage system includes a first interface control device that receives from the at least one computer an access request designating identification information of a file. A second interface control device connecting to the first interface control device is provided. A plurality of disks connecting to the second interface control device are provided. The plurality of disks include at least one first disk, and at least one second disk, the first disk and the second disk are of different kinds. The first interface control device decides based on identification information received from the computer a storage position of data of the file designated by the identification information within the plurality of disks. The second interface control device controls to store the data of the file designated by the identification information at the storage position decided by the first interface control device.

The Search Results

To determine the patentability of the claims as submitted in the application, a thorough and careful search was conducted in the United States Patent and Trademark Office in Class 707, subclass 205; Class 711, subclasses 112-114, 117-118, 147, 151, and 170; and Class 714, subclasses 7. This search was conducted by Iuliana Tanase, an associate at the firm of Lacasse & Associates, L.L.C.

The pre-examination search uncovered the following pertinent patents and published applications, copies of which are attached hereto:

U.S. Patents

<u>U.S. Patent No.</u>	<u>Inventor(s)</u>
6,275,898	DeKoning

U.S. Patent Applications

<u>U.S. Patent Application Publication No.</u>	<u>Inventor(s)</u>
2001/0054133	Murotani et al.
2004/0044854	Gibble et al.
2004/0098394	Merritt et al.

The Applied References

The DeKoning reference is generally directed to methods and structures for defining logic units (LUNs) within a Redundant Array of Inexpensive Disks (RAID). (See, *DeKoning; Abstract; Col. 1, lines 31-37; Col. 3, lines 12-20; Figure 1*). According to DeKoning, LUNs are logic partitions within a storage system and may physically be stored in multiple disks. *Id.* A RAID storage system with LUNs defined adds the advantage of reliability at the cost of additional disks and performance penalty. The RAID storage system may adjust the trade-off between addition disks and performance penalty by management method of LUNs. (See, *DeKoning; Col. 1, lines 21-31; Col. 2, lines 10-34*). DeKoning discloses a RAID system having multiple partitions within a LUN, each partition having different management method. Moreover, DeKoning discloses changing the management method of the partitions, or migration, according to the frequency of access.

DeKoning also discloses resizing the LUN partitions for migration. (*See, DeKoning; Col. 3, line55 – Col. 4, line 55*).

The Murotani reference is generally directed to a storage system having multiple disks and multiple storage volume configured therein. An external manger is provided to monitor the performance of the disks. (*See, Murotani; Page 2, Para. 0019*). According to Murotani, the external manager gathers access data on the storage system by different applications. The data gathered is used to optimally configure the storage system for corresponding applications. (*See, Murotani; Abstract; Page 2, Para. 0020-21, 0023, and 0026*).

The Gibble reference is generally directed to a storage system performing reclaiming of storage devices. According to Gibble, the storage devices are divide into pools. A tape server connecting to the pools stores pool information, including a pool threshold level and a target tool. When a storage device is selected, a determination is made on whether the selected device has exceeded utilization beyond the pool threshold level. If the threshold level is reached, the data in the selected storage device is copied into the target pool. (*See, Gibble, Abstract; Page 1, Para. 0009*).

The Merritt reference is generally directed to a software framework that intelligently connects application to storage system. (*See, Merritt; Page 2, Para. 0022, Para. 0025*). According to Merritt, the software storage controller is disposed between the virtual file system and a file system within an operation system. (*See, Merritt; Page 3, Para. 0042-0043; Figure 1*). The software storage controller detects events such as a file system events and device events. Upon detection, the software storage controller initiates appropriate data management activities based on the file system activity and user-administered policy-based management. (*See, Merritt; Page 1, Para. 0017*).

**The Present Invention is Patentably Distinguishable Over the Cited
References**

The present application is generally directed to a network storage system having multiple type of disks, and the hierarchical storage control thereof.

The applied references do not disclose or suggest the features and steps of the claims of the present invention. In particular, the applied references do not disclose or suggest the limitations, “a first interface control device that receives from the at least one computer an access request designating identification information of a file,” “a second interface control device connecting to the first interface control device,” “a plurality of disks connecting to the second interface control device, wherein the plurality of disks include at least one first disk, and at least one second disk,” “first interface control device decides based on identification information received from the computer a storage position of data of the file designated by the identification information within the plurality of disks,” and “the second interface control device controls to store the data of the file designated by the identification information at the storage position decided by the first interface control device,” as required by the present invention as defined by independent Claim 1.

Independent Claim 1 is directed to a storage system having multiple types of storage device connecting to one or more interface control devices. DeKoning does not teach or suggest a storage system having storage medium of different types. Moreover, DeKoning fails to teach or disclose the limitation, “first interface control device decides **based on identification information received from the computer** a storage position of data of the file designated by the identification information within the plurality of disks,” as required by Independent Claim 1. According to DeKoning, the storage controller having a performance monitor which includes a performance monitor and a storage utilization monitor. The storage controller migrates the partitions in LUN based on the performance monitor. (See,

DeKoning; Col. 8, line 64 – Col. 9, line 39). Accordingly, DeKoning cannot anticipate nor render obvious Independent Claim 1.

Murotani does not teach or suggest a storage system having storage medium of different types. Moreover, Murotani fails to teach or disclose the limitation, “first interface control device decides **based on identification information received from the computer** a storage position of data of the file designated by the identification information within the plurality of disks,” as required by Independent Claim 1. According to Murotani, an external performance manager is provided in a storage system. The external manager gathers access data on the storage system by different applications. Murotani does not teach or disclose a first interface control devices that receives identification information form a host computer and decides the storage location based on the received information. Accordingly, Murotani cannot anticipate nor render obvious Independent Claim 1.

Gibble discloses a storage system having multiple types of storage element connected hierarchically. (*See, Gibble; Figure 2; Page 2, Para. 0024-0025*). However, Gibble fails to teach or disclose the limitation, “first interface control device decides **based on identification information received from the computer** a storage position of data of the file designated by the identification information within the plurality of disks,” as required by Independent Claim 1. Gibble discloses a centralized storage server. (*See, Gibble; Figures 1 and 2*). The server stores pool information including a pool threshold level and a target tool. When a storage devices within a pool is selected, a determination is made whether the selected device has exceeded the pool threshold level stored in the server. (*See, Gibble, Abstract; Page 1, Para. 0009*). Gibble does not teach or disclose a first interface control devices that receives identification information form a host computer and decides the storage location based on the received information. Accordingly, Gibble cannot anticipate nor render obvious Independent Claim 1.

Merritt discloses a storage device can be a device including one or more storage medium. (*See, Merritt; Page 3, Para. 0041*). However Merritt teaches a software storage controller disposed between the virtual file system and a file system within an operation system. (*See, Merritt; Page 3, Para. 0042-0043; Figure 1*). Accordingly Merritt does not teach or suggest “a first interface control **device** that receives from the at least one computer an access request designating identification information of a file” and “a second interface control **device** connecting to the first interface control device” as required by independent Claim 1. Moreover, Merritt is directed toward a software paradigm and is not applicable to present invention in general. Accordingly, Merritt cannot anticipate nor render obvious Independent Claim 1.

Since the applied references fail to disclose, teach or suggest the above feature and limitations recited in independent Claim 1, these references cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, independent Claims 1 is believed to be in condition for allowance and such allowance is respectfully requested. It is also respectfully submitted that independent Claims 8, 15, 20, and 25 are believed to be allowable for at least the same reasons as those discussed in connection with independent Claim 1.

The remaining claims depend either directly or indirectly from independent claims 1, 8, 15, 20, and 25 and recite additional features and steps of the invention which are neither disclosed nor fairly suggested by the cited references and are therefore also believed to be in condition for allowance.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance and such action is respectfully requested.

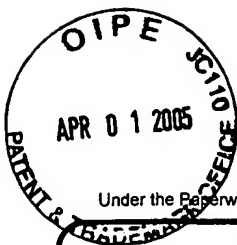
If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los

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PATENT
Attorney Docket No. 81940.0070
Customer No. 26021

Angeles, California telephone number (213) 337-6809 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this petition, please charge the fees to our Deposit Account No. 50-1314.



PTO/SB/17p (11-04)

Approved for use through 07/31/2007. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PETITION FEE
Under 37 CFR 1.17(f), (g) & (h)
TRANSMITTAL
(Fees are subject to annual revision)

Send completed form to: Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	10/775,886
Filing Date	February 10, 2004
First Named Inventor	Naoto Matsunami, et al.
Art Unit	2655
Examiner Name	To Be Assigned
Attorney Docket Number	81940.0070

Enclosed is a petition filed under 37 CFR § 1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.

Payment of Fees (small entity amounts are NOT available for the petition fees)

☒ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1314:

☐ petition fee under 37 CFR 1.17(f), (g) or (h) ☒ any deficiency of fees and credit of any overpayments

Enclose a duplicative copy of this form for fee processing.

☐ Check in the amount of \$ _____ is enclosed.

☐ Payment by credit card (Form PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.

Petition Fees under 37 CFR 1.17(f): Fee \$400 Fee Code 1462

For petitions filed under:

§ 1.53(e) - to accord a filing date.

§ 1.57(a) - to accord a filing date.

§ 1.182 - for decision on a question not specifically provided for.

§ 1.183 - to suspend the rules.

§ 1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.

§ 1.741(b) - to accord a filing date to an application under § 1.740 for extension of a patent term.

Petition Fees under 37 CFR 1.17(g): Fee \$200 Fee Code 1463

For petitions filed under:

§ 1.12 - for access to an assignment record.

§ 1.14 - for access to an application.

§ 1.47 - for filing by other than all the inventors or a person not the inventor.

§ 1.59 - for expungement of information.

§ 1.103(a) - to suspend action in an application.

§ 1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.

§ 1.295 - for review of refusal to publish a statutory invention registration.

§ 1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.

§ 1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.

§ 1.550(c) - for patent owner requests for extension of time in ex parte reexamination proceedings.

§ 1.956 - for patent owner requests for extension of time in inter partes reexamination proceedings.

§ 5.12 - for expedited handling of a foreign filing license.

§ 5.15 - for changing the scope of a license.

§ 5.25 - for retroactive license.

Petition Fees under 37 CFR 1.17(h): Fee \$130 Fee Code 1464

For petitions filed under:

§ 1.19(g) - to request documents in a form other than that provided in this part.

§ 1.84 - for accepting color drawings or photographs.

§ 1.91 - for entry of a model or exhibit.

§ 1.102(d) - to make an application special.

§ 1.138(c) - to expressly abandon an application to avoid publication.

§ 1.313 - to withdraw an application from issue.

§ 1.314 - to defer issuance of a patent.


Signature

Dariush G. Adli

Typed or printed name

March 29, 2005

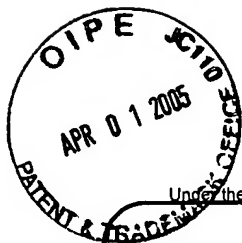
Date

51,386

Registration No., if applicable

This collection of information is required by 37 CFR 1.17. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 5 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PTO/SB/21 (09-04)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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**TRANSMITTAL
FORM**

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

28

Application Number

10/775,886

Filing Date

February 10, 2004

First Named Inventor

Naoto Matsunami, et al.

Art Unit

2655

Examiner Name

To Be Assigned

Attorney Docket Number

81940.0070

ENCLOSURES (Check all that apply)

<input checked="" type="checkbox"/> Petition / Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input checked="" type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/ Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input checked="" type="checkbox"/> Petition to Make Special <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): Copy of Search Report dated July 14, 2004.
Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	HOGAN & HARTSON L.L.P.		
Signature			
Printed name	Dariush G. Adli		
Date	March 29, 2005	Reg. No.	51,386

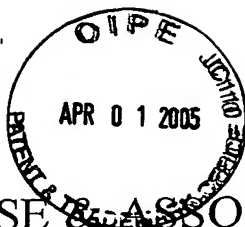
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I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Kimberly Yee	Date	March 29, 2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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July 14, 2004

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Via Federal Express

Noboru Otsuka
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IP Development & Management Division
Patent Dept. 4
292, Yoshida-cho, Totsuka, Yokohama-shi
Kanagawa, Japan 244-0817

RE: PATENTABILITY SEARCH FOR STORAGE DEVICE
Your File: 340300194US01
Our Docket: PSP-1041589

Dear Mr. Otsuka:

In accordance with your request, we have conducted a patentability search on the above-identified subject matter.

Enclosed with this report are copies of the search results and your disclosure materials. If after reviewing the results, you feel that the search feature (or specific search elements), the field of search, or results are not commensurate with your original request, or you would like to extend the search into additional areas, please contact us.

Sincerely,

Ram Soundararajan
Ram Soundararajan

Enclosures
RS:JT:pd
s04/psp1041589

CONFIDENTIAL
(Patentability Search)

I. SEARCH FEATURE

A. General

Storage Device

B. Specific

A storage system that is connected to at least one computer, the storage system comprising:

a first interface control device that receives from the at least one computer an access request designating identification information of a file;

a second interface control device connecting to the first interface control device; and

a plurality of disks connecting to the second interface control device, wherein the plurality of disks include at least one first disk, and at least one second disk, the first disk and the second disk being different kinds, the first interface control device decides based on identification information received from the computer a storage position of data of the file designated by the identification information within the plurality of disks, and

the second interface control device controls to store the data of the file designated by the identification information at the storage position decided by the first interface control device.

C. Application

Storage area networks

II. FIELD OF SEARCH

The search of the above features was conducted in the following areas:

A. Classification search

<u>Class</u>	<u>Subclasses</u>	<u>Description</u>
707/		DATA PROCESSING: DATABASE AND FILE MANAGEMENT OR DATA STRUCTURES
	205	. File allocation
711/		ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MEMORY
	112	... Direct access storage device (DASD)
	113 Caching
	114 Arrayed (e.g., RAIDs)
	117	. Hierarchical memories
	118	.. Caching
	147	. Shared memory area
	151	.. Prioritized access regulation
	170	. Memory configuring
714/		ERROR DETECTION/CORRECTION AND FAULT DETECTION/RECOVERY
	7 Reconfiguration (e.g., adding a replacement storage component)

The above subclasses represent areas deemed to contain subject matter of interest to one or more of the search features. Please note that relevant references may be classified outside of these areas. The integrity of the search is based on the records as presented to us by the United States Patent and Trademark Office (USPTO). No further integrity studies were performed. Also a key word search was performed on the USPTO full-text database including published U.S. patent applications.

III. RESULTS OF SEARCH

A. References developed as a result of search (related art is in boldface):

<u>U.S. Patent No.</u>	<u>Inventor</u>
6,275,898 B1	DeKoning

<u>U.S. Patent Application Publication No.</u>	<u>Inventor</u>
2001/0054133 A1	Murotani et al.
2004/0044854 A1	Gibble et al.

U.S. Patent Application Publication No.
2004/0098394 A1

Inventor (continued)
Merritt et al.

B. Discussion of related references in numerical order:

The patent to DeKoning (6,275,898 B1), assigned to LSI Logic Corporation provides for *Methods and Structure for Raid Level Migration Within a Logical Unit*. Disclosed are methods and structures for defining partitions within a LUN of a RAID storage system, such that each partition is managed in accordance with a RAID storage management technique independent of the other partitions. One or more storage controllers 104 within storage system 100 are operable to process I/O requests on behalf of hosts 102 for storage and retrieval of data to and from storage system 100. RAM 210 in controller 104 also stores data and meta-data used to manage the LUNs of the storage system and the partitions defined within those LUNs (see figures 1 and 3 and column 5, lines 11-15 and 57-59).

The patent application publication to Murotani et al. (2001/0054133 A1) provides for a *Data Storage System and Method of Hierarchical Control Thereof*. Discussed are two or more controllers and an external manager, the external manager having the functions of gathering, compiling and managing the activity rate of each physical drive constituting logical volumes. The external manager generates a data migration instruction and inputs application priority conditions and a priority period to equilibrate the accessing load, and issues an instruction to the controller (see figure 5 and paragraphs 11 and 12).

The patent application publication to Gobble et al. (2004/0044854 A1), assigned to International Business Machines Corporation provides for a *Method, System, and Program for Moving Data Among Storage Units*. Described are implementations providing techniques for managing data in storage pools and reclaiming data in a storage unit in one source pool to a storage unit in a different target storage pool, where the source and target storage pools may have different attributes. Storage management software 40 may migrate data from the disk array 36 to the tape server 32 using hierarchical storage management (HSM) algorithms and techniques (see figure 2 and paragraphs 13 and 24).

The patent application publication to Merritt et al. (2004/0098394 A1) provides for a *Localized Intelligent Data Management for a Storage System*. The data management utility monitors and redirects file system activity targeted to or originating from one or more storage devices and initiates appropriate data management activity. According to one embodiment, a framework is provided that uniquely couples backups with HSM. HSM feature allows primary storage to

be used to manage current, active files, while older files may be released to backup media (see paragraphs 17, 33).

A handwritten signature in cursive script, appearing to read "Julia", is written above a horizontal line.

Julia Tanase